Center Independent Research & Development: GSFC IRAD

Goddard radio-frequency explorer Radio frequency Interference real time Display system (GRID)

Completed Technology Project (2013 - 2014)

Project Introduction

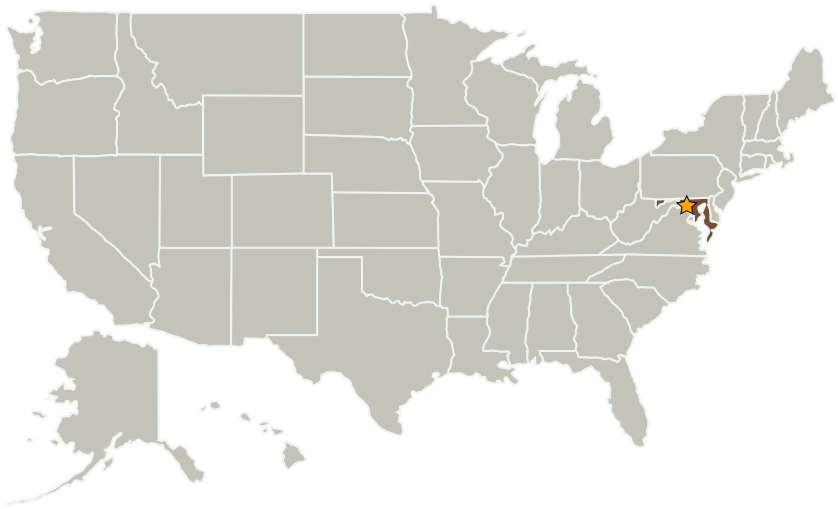
RFI is an increasingly important factor in the quality performance of radiometer instruments while the quantity of usable microwave measurements is decreasing due to the presence of RFI. Because of the widespread use of wireless communications such as cellphone and satellite TV, the frequencies reserved for the science community are seeing more and more contamination. In particular, no scientific data can be retrieved for the heavily RFI contaminated region. This problem led to the Soil Moisture Active Passive (SMAP) mission implementation of an RFI detection capability on its radiometer digital backend. However, this instrument is limited by the sampling speed and processing resources available. In particular, the digital backend frequency bandwidth is limited to 24MHz. This shows that the spaceflight technology for RFI detection is limited any the higher frequencies for K, Ka band or beyond.

This effort proposes a game-changing, higher frequency RFI detection and mitigation digital backend for microwave radiometers. Prototyping a high frequency RFI detection instrument by combining the GREX system with a new RFI detection algorithm based on information theory and complex-valued signal processing.

Anticipated Benefits

For long term, this instrument is going to be proposed as part of a RFI detection instrument for future microwave radiometer missions.

Primary U.S. Work Locations and Key Partners



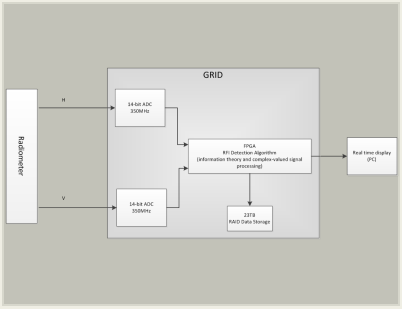


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Table of Contents

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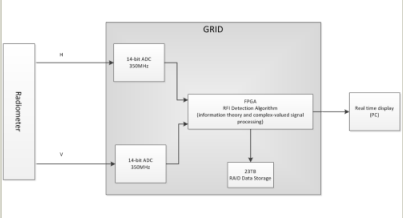
Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Maryland

Images



Goddard radio-frequency explorer Radio frequency Interference real time Display system Project
Goddard radio-frequency explorer Radio frequency Interference real time Display system Project *(https://techport.nasa.gov/image/4231)*

Project Website:

http://sciences.gsfc.nasa.gov/sed/

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:

Peter M Hughes

Project Manager:

Wesley A Powell

Principal Investigator:

Englin Wong

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.2 Radio Frequency
    - TX05.2.1 Spectrum-Efficiency